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Year 2005 Progress Report of Activities Los Lunas Plant Materials Center

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This report highlights a few of the major activities at the Los Lunas Plant Materials Center (LLPMC) during 2005. For detailed information, contact us at the LLPMC.

Who We Are

The Los Lunas Plant Materials Center is one of 27 Plant Materials Centers operated by the USDA Natural Resources Conservation Service (NRCS). Areas served by the LLPMC include New Mexico, Northeast Arizona, Southeast Colorado, West Texas, and Southeast Utah. The LLPMC is located twenty-five miles south of Albuquerque in Los Lunas, New Mexico. It is operated in conjunction with New Mexico State University's Agricultural Science Center. The facility is located in the Middle Rio Grande Valley and includes 200+ acres of irrigated land.

Los Lunas Plant Materials Center at Los Lunas, NM

What We Do

It is our mission to develop, test and transfer effective, state-of-the-art plant science technology to meet customer and resource needs. The LLPMC targets these major land resource areas (ecozones):

- New Mexico and Arizona mountains
- San Juan River Valley plateaus and mesas
- Southern desert basin, plains and mountains
- Southern Rocky Mountains
- High intermountain valleys
- Pecos–Canadian plains and valleys
- Southern high plains

The LLPMC emphasizes using native plant materials to solve conservation problems. Environmental conditions including low precipitation, high intensity rainfall, wind, topography, and varied land uses combine to produce a variety of problems needing plant material solutions.

The LLPMC collects superior adapted plants for testing, selecting, and distributing to commercial growers along with seed and plant production technology. Additionally, plant establishment technologies are developed or refined that require minimal or no irrigation in the arid southwest. The following major objectives are addressed:

- Rangeland Erosion Control
- Cropland Erosion Control
- Water Quality Maintenance and Improvement
- Wildlife Habitat Improvement

The articles on the following pages provide a brief summary of Year 2005 accomplishments. For more detailed technical information, request the *2005 Annual Technical Report*.

Alkali Muhly Released in 2006

Species good for riparian restoration, offers potential for other uses

Alkali muhly, sometimes called scratchgrass, (*Muhlenbergia asperifolia*) was released in 2006 by the Los Lunas Plant Materials Center (LLPMC) to commercial seed producers. The typical habitats for this species are damp meadows, moist riparian zones, and mesic (moderately moist) disturbed areas often with alkaline and saline soils. Alkali muhly is a perennial grass with elongated scaly rhizomes (under-grown stems that spread from the original plant and initiate new plants) and an open, finely-branched seed head up to 18 inches tall. The seed used to develop this selected release was collected in a damp arroyo bottom near the Westwater Spring in San Juan County, New Mexico. Selection for agronomic production potential has resulted from several successive field plantings at the LLPMC. A one-acre field produces about 80 lbs. of bulk seed. For 2005, a one-acre field produced 84.5 lbs of seed, at 96 percent purity and 82 percent germination.

The application of this species for riparian restoration on mesic sites with moderate salinity or alkalinity is a certainty. The LLPMC will investigate the potential range of use of this species on more xeric and saline soils. The rhizomatous nature of this species, as well as its tendency to thrive on shorelines of ditches and streams, will make it very useful in bank stabilization. Because of its rapid spread, it could be planted as seedling stock at low density to rapidly colonize stream and ditch banks susceptible to erosion.

Alkali muhly is common in the Middle Rio Grande Bosque in New Mexico. A one-acre production field at the LLPMC netted a harvest of 81 bulk-pounds of seed in 2005.

Several land management agencies have also encouraged the development of this release, in particular the U.S. Department of Interior-Bureau of Reclamation who has partially funded this effort. The LLPMC will have limited quantities available in 2006 for testing to those who are interested. Both Southwest Seed (in Dolores, Colorado) and Curtis & Curtis, Inc. (in Clovis, New Mexico) have begun production, and they should have it available to sell by 2008.

Plant Materials for Former Saltcedar Sites Being Developed

Reaching for Species Adapted to Fine-Textured Saline Soils

The Los Lunas Plant Materials Center received funding in 2004 to begin a plant materials development project for the U.S. Fish and Wildlife Services through the Bosque del Apache National Wildlife Refuge. The goal of the project is to develop grass, forbs, and shrub species adapted to fine-textured saline soils which are often found after saltcedar eradication activities in the southwest United States.

A number of large saltcedar clearing projects are being performed under the auspices of several soil and water conservation districts in New Mexico. Many cleared sites have deep alluvial water tables resulting from channel incision and flow management on the major rivers in the state like the Rio Grande and Pecos. This deep ground water and lack of flooding potential imply that many of these sites are not appropriate for revegetation with riparian plants but must be revegetated with non-phreatophytic xeric species which can persist on fine-textured saline soils.

New seed production field of Alkali sacaton (*Sporobolus airoides*) producing 75 bulk lbs/acre the second year after planting.

Although several appropriate species are presently commercially available including alkali sacaton (*Sporobolus airoides* 'Salado') and fourwing saltbush (*Atriplex canescens*), in particular the Vallis race, there is a need to develop commercial supplies of additional species to augment the species diversity of these sites.

Several species currently under development at the Los Lunas Plant Materials Center, giant sacaton (*Sporobolus wrightii*) and vine mesquite (*Panicum obtusum*), will probably prove appropriate for some of these former saltcedar sites, but their adaptation to salinity, aridity, and fine-textured soils will have to be further evaluated. Additional species which are presumed to have these adaptations will be identified, and seed collections will be made representing different populations. Germination and growth under soil conditions typically present on former saltcedar sites will determine those species best adapted to

these sites. These superior species or ecotypes will then begin the process of seed increase and cultivar release.

LLPMC Releases Restoration Guidance

Years of Experience Available to Help Conservationists

The Los Lunas Plant Materials Center (LLPMC) has produced two flyers that discuss guidelines related to the restoration of riparian areas in the Southwest: "Guidelines for Planning Riparian Restoration in the Southwest" presents a number of concerns that must be addressed when developing riparian restoration projects as well as responses or solutions to these potential problems The problems described in the flyer are commonly faced during riparian restoration and include:

- extreme depth to ground water and severe water table fluctuation
- revegetation limitations due to soil salinity and/or soil texture extremes
- loss of planting stock from the scouring action of flood flows
- eradication of woody invasive species and the removal of the resulting biomass
- identifying the appropriate plant community–woody riparian versus wet meadow
- effect of weed competition on revegetation
- advance planning for plant materials production and stock type decisions

- planting methods for riparian sites
- watering of planted containerized stock
- protection and maintenance of revegetated sites, and
- the desired landscape objectives.

These concerns and the potential responses are based on two decades of riparian revegetation experience by the Plant Materials Center. The Center is always exploring new issues with demonstration plantings that can impact the success of revegetation efforts, and believes that others can learn from this trial experience.

The second flyer presents "Guidelines for Planting Dormant Pole Cuttings in Riparian Areas of the Southwest–The Pole Cutting Solution" is based on two decades of technology development at the Los Lunas Plant Materials Center.

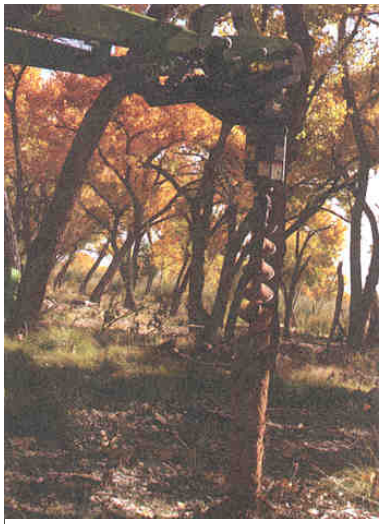
The topics addressed include the advantages of use dormant pole cuttings as a revegetation stock type, characteristics of the pole cuttings which influence successful riparian restoration, site factors that have an effect on the establishment of pole cuttings, and methods of planting pole cuttings and maintaining the revegetated site. This flyer addresses the lessons learned, and helps those contemplating a pole planting to consider the many issues which can affect the ultimate success of a riparian restoration project.

PMC Studies Deep Planting Methodology

Unusual Method Works in Riparian Environment

The Los Lunas Plant Materials Center (LLPMC) is experiencing success with a new deep planting methodology for planting native shrub transplants on a 33-acre riparian site on the Rio Grande in Bosque, New Mexico south of Belen. They are using shrubs grown in the one gallon, 14-inch deep treepots. What is unusual is these shrubs are being planted into 6-foot holes where the plants root crowns are buried. Typically, this practice would kill most transplants.

Riparian shrub species have evolved over thousands of years in association to flooding and seem to be tolerant to being buried in sediments, or in this case, being planted deep in the soil. The roots of the transplants are placed to the depth of the capillary fringe of the water table. Because the root system is in moist soil, it will not be necessary to irrigate these plants unless the capillary fringe of the water table drops below the root zone.



Auger used for planting

The Bosque, New Mexico location being used in the study had an adequate stands of cottonwoods and herbaceous understory, but only a few native understory shrubs. Subsequently, only native understory shrubs were planted here.

These transplant shrubs were grown to have shoot systems (biomass above the root crown) that can be up to

seven feet tall even though their root systems are generally 12 inches in length due to the restriction imposed by the pot. Typically one would conclude that the shoot system is not in balance with the root system.

This new deep planting methodology is exactly what you need for success. The plants are buried four-to-five feet deep, and at least the top three feet of the shoot should be above the soil surface so they are not shaded by other low growing plants.

Prior to the LLPMC planting this site, it was cleared of exotic phreatophytes using the cut stump method with 'Garlon 4' and vegetable oil and was done with only minimal surface disturbance. This method involves felling the trees by hand with chain saws, painting the stumps with herbicide, and then cutting the main stem and branches for firewood, and finally chipping the 6-inch diameter or less into surface mulch. Continued monitoring and spot treating sprouts of the exotic species with herbicide is necessary for control. With only limited surface disturbance, very few weeds emerged which provided for favorable planting conditions. Dense stands of weeds can be more competitive than the desired plants for water, light and nutrients.

The LLPMC planted 1,000 transplants using the deep planting methodology in 2004, and they recently planted 800 more in 2005. The plants are watered once after planting to provide for good root to soil contact. Those planted in 2004 were not irrigated during the 2005 growing season, and as of November 2005, show a 95% survival rate.

Assistance–Conservation Concerns

The Los Lunas Plant Materials Center (LLPMC) has worked directly with NRCS Field Offices, Resource Conservation and Development Offices, and Soil and Water Conservation Districts to provide assistance with the following conservation concerns:

- Wind erosion
- Increased forage on rangeland

Solutions to the concerns have included field wind strips, variety trials, and revegetation techniques. Providing assistance allows the LLPMC opportunities to test new plant materials and demonstrate new planting techniques.

Wind Erosion

The LLPMC continues to provide giant sacaton transplants for trial plantings throughout the LLPMC service area. These trial plantings help to evaluate the effectiveness of giant sacaton as field and farmstead wind strip that aids in the prevention of wind erosion and determine the range of adaptation. The first of the trial wind strip plantings was established in 1999 in Columbus, New Mexico. Columbus is located approximately 2 miles north of the Mexican border, and the conditions are very hot, dry, and windy. Since then, several wind strip plantings have been established throughout the state, under many different growing conditions.

The wind strips provides two important benefits during the critical wind erosion period:

1. Establishes a barrier to protect against wind erosion.
2. Prevents soil particles from moving across the soil surface causing damage to young seedlings.

In 2003, the LLPMC produced giant sacaton transplants for installation of a windstrip planting at the USDA Service Center in Lovington, NM. These plants were to provide a landscaping windbreak in conjunction with a tree windbreak planting for the Service Center.

The giant sacaton planting allows the LLPMC to evaluate sacaton in this part of New Mexico and provides an opportunity for visitors who come to the Service Center to see a live planting of this species. The LLPMC is looking for new sites to test giant sacaton and encourage anyone interested in installing a planting to contact the LLPMC at (505) 865-4684.

Giant sacaton planting at the USDA-NRCS Service Center in Lovington, New Mexico.

Forage and Rangeland

In 2004, the Espanola Field Office requested assistance for a landowner near Tres Piedras, New Mexico. Due to grazing elk, the land owner had been experiencing a loss of available forage on his ranch. The elk were eating the cool-season forage produced during the spring months, leaving very little forage for livestock during the summer grazing period. Because the ranch is located at a high elevation, the production of warm-season grass is very low. The warm-season grass species already established on the ranch (especially the blue grama) does not produce an adequate amount of forage for grazing purposes.

The Espanola Field Office became aware of blue grama being grown for seed production near Alamosa, Colorado. As a result, the field office requested a demonstration trial planting of blue grama varieties on the ranch. In July of 2004, four different varieties of blue grama were installed: Hachita, Alma, Lovington (LLPMC releases)

and Bad River ecotype (released from the Bismarck Plant Materials Center in North Dakota). The Bad River ecotype originated from a blue grama collection made from the Bad River region of South Dakota.

The 2004 planting was not successful because of the late seeding date and meager rainfall received at the site. In June of 2005, a replicated seeding of the four blue grama varieties; Hachita, Lovington, Alma and Bad River Ecotype was installed. The Bad River Ecotype was included to determine if a northern climate-type of blue grama would do better at this high elevation (8,200 feet).

The 2005 seeding was visually checked in September 2005, and all four varieties had successfully germinated. The planting will be fully evaluated in 2006 for the percentage of cover, growth, and forage production.

Carl Smith ranch before the trial planting.

The trial planting shows germination of blue grama.

National Park Service Assistance

In 2005, the LLPMC had agreements with Carlsbad Caverns National Park, Capulin Volcano National Monument, Grand Canyon National Park, Hubbell Trading Post National Historic Site, Pipe Spring National Monument, and Zion National Park of the Department of the Interior's National Park Service (NPS). These agreements allow the LLPMC to assist the NPS to revegetate disturbed areas in the parks, such as roadsides, trails, campgrounds, and other construction areas. The LLPMC provides the NPS with plant materials of the parks' local native ecotypes by producing both seed and containerized transplants for revegetation purposes.

Sideoats grama grass plot for Carlsbad Caverns National Park growing at the Los Lunas Plant Materials Center.

During 2005, the LLPMC had 12 native grass species in production on a total of 9.58 acres, and was able to produce 205 pounds of grass seed to be used for NPS revegetation efforts. In 2005, the LLPMC provided 80 containerized transplants of four native shrub and tree species to the NPS.

Producing certain native species for the NPS can be challenging for the LLPMC, even if the species has been grown for many years. Blue grama, a species that has extensive field production data from many Plant Materials Centers and commercial growers, has proven to be a challenge. The collection of blue grama that comes from the Grand Canyon National Park continues to mystify the LLPMC because of its inability to follow the traditional blue grama production patterns.

The blue grama collection from the Grand Canyon National Park (already in production for several years at the LLPMC) has never produced the amount of seed that a typical blue grama field produces. In 2005, the LLPMC used a proven technique of burning a dormant stand of blue grama to increase the amount of seed production. Unfortunately this technique did not work.

In 2006, the LLPMC will not use any burning procedures, but will increase fertilization and irrigation in the hope of producing a greater amount of blue grama seed for the Grand Canyon National Park.

Grand Canyon field of blue grama after a burning treatment of the dormant grass.

Partnering with the New Mexico Department of Transportation to Improve Dry-Land Seeding Technology

In 2005, a cooperative agreement was developed between the New Mexico Department of Transportation (NMDOT) and the Natural Resources Conservation Service's Los Lunas Plant Materials Center (LLPMC). The new agreement begins a three-year project between the two agencies to evaluate the revegetation technology currently being used by the NMDOT. The NMDOT has had difficulty meeting the national vegetation requirements following the completion of road construction projects. The proposed work in the new 2005 agreement will study the current revegetation technology and determine its effectiveness.

In 1992 (as a result of a similar agreement), the LLPMC produced a Handbook of Roadside Vegetation Management that contained the necessary information to successfully revegetate areas that were disturbed by roadside construction. Species selection for seed mixes in this handbook was based upon species identified in the Natural Resources Conservation Service range site descriptions for a particular location. The NMDOT would like a more simplified procedure based on only three standard seed mixes for Region 6 (northwest New Mexico): one for desert regions, one for the foothill pinion-juniper region, and one for all of Region 6 that consists of a cool-season, xeric mixture than can be successfully seeded in the fall.

Beginning in 2006, the NMDOT and the LLPMC will identify the study sites, select the plant species, select different mulching treatments, and apply the treatments on road construction projects. Mulching treatments will include using pinion wood chips. These treatments will be evaluated for three years and consider cover, density, and species composition.

The new agreement allows the LLPMC an opportunity to investigate new mulching treatments and new plant materials that have been made available since 1992 and were not evaluated in the first NMDOT revegetation study by the LLPMC. The outcome of this agreement will provide useful information about revegetation technology for both the NMDOT and the LLPMC.

Legumes for Burn Rehabilitation in Pinyon-Juniper Communities

The Los Lunas Plant Materials Center received funding starting in FY 2006 from the Gila National Forest to assist in the development and evaluation of legume species for use in post-fire rehabilitation of pinyon-juniper communities in the Southwest. This congressional earmarked funding was included under the National Fire Plan – Restoration/Rehabilitation of Burned Areas for the development and use of native plant materials. The Gila National Forest has asked the LLPMC to examine the seed propagation of legume species and evaluate the forage quality and agronomic potential for seed production. Species of *Dalea* will be of particular interest because they are preferred deer forage, produce abundant quantities of seed, fix nitrogen, and are among only a few forbs that have established naturally after burn treatments in pinyon-juniper communities.

The first species to be evaluated has been tentatively identified as foxtail prairie clover, *Dalea leporina*. Preliminary germination tests have shown very rapid germination after hot water scarification. Percussion treatments have shown lesser but still appreciable improvements in germination compared with untreated seed which exhibit high percentages of physical dormancy. In 2006 plants will be grown out for forage analysis and pilot-scale plantings for seed production will be established using plug seedling transplants.

Riparian Plant Material Development for the Cibola National Forest

The Cibola National Forest has entered into an interagency agreement with the Los Lunas Plant Materials Center to develop ecotype specific riparian plant materials for watershed and ecosystem restoration projects. This project was initiated in 2005 with US Forest Service earmarked funding for Restoration/Rehabilitation of Burned Areas with native plant materials. The principal restoration projects include revegetation following salt cedar control on the Upper Canadian River within the Kiowa National Grassland and watershed restoration in the Manzano Mountains.

In 2005, seed of Fremont cottonwood and peachleaf and coyote willow were collected from Mills Canyon in the Kiowa National Grasslands and propagated at the LLPMC; these seedlings will be used to establish pole production blocks and produce large containerized stock

in 2006. Other species being propagated for containerized stock of Upper Canadian River ecotypes include chokecherry, rushes, and bulrushes. These plant materials will used to revegetate areas after salt cedar eradication has been completed in 2007. The initial species collected and propagated for watershed restoration in the canyons of the Manzano Mountains is fivepetal cliffbush (*Jamesia americana*).

Distribution of Plant Materials in 2005

Nineteen USDA-NRCS New Mexico Field Offices received plant materials as well as a number of federal, tribal, and municipal agencies. In addition, plant materials were distributed to commercial producers of native seed and plants. A high demand for riparian plants has developed as a result of the clearing of 34,000 acres of saltcedar on public and private lands in New Mexico in the last five years. Many of the plant materials distributed by the LLPMC have been used to revegetate these cleared riparian areas. The following table lists the plant materials that were distributed by the LLPMC in 2005.

2005 Plant and Seed Distribution

Distributed to	Poles	Cuttings and whips	30-inch tallpots	One-gallon treepots	Small containers	Seed PLS (pounds)
NRCS 19 Field Offices	873	112	—	524	1,880	5
NRCS RC&D's	—	—	—	101	1,653	—
PMC's	—	—	—	—	—	10
Seed Growers	—	—	—	—	—	741
Nurseries	—	2,441	—	25	—	—
USFWS—Partners for Wildlife	21	—	—	179	686	—
USFWS Bosque del Apache NWR	—	—	—	136	2,152	—
National Park Service	—	—	—	80	—	25
Bureau of Reclamation	43	3,950	—	170	—	17
Apache-Sitgreaves National Forest	—	—	—	72	—	—
US Geological Survey	—	—	—	96	25	—
US Army Corp of Engineers	3,501	9,180	200	2,061	—	—
Middle Rio Grande Conservancy District	—	—	972	180	—	—
Valencia SWCD	—	—	77	784	—	—
City of Albuquerque	575	—	759	71	—	—
Bureau of Land Management	206	310	—	43	—	—
Forest Guardians	880	—	—	101	375	—
Hopi Tribe	—	—	—	547	250	—
Other Cooperators	240	3,000	—	12	110	25
Total	**6,339**	**18,993**	**2,008**	**5,132**	**7,131**	**823**